

Longer Life for Steel Structures

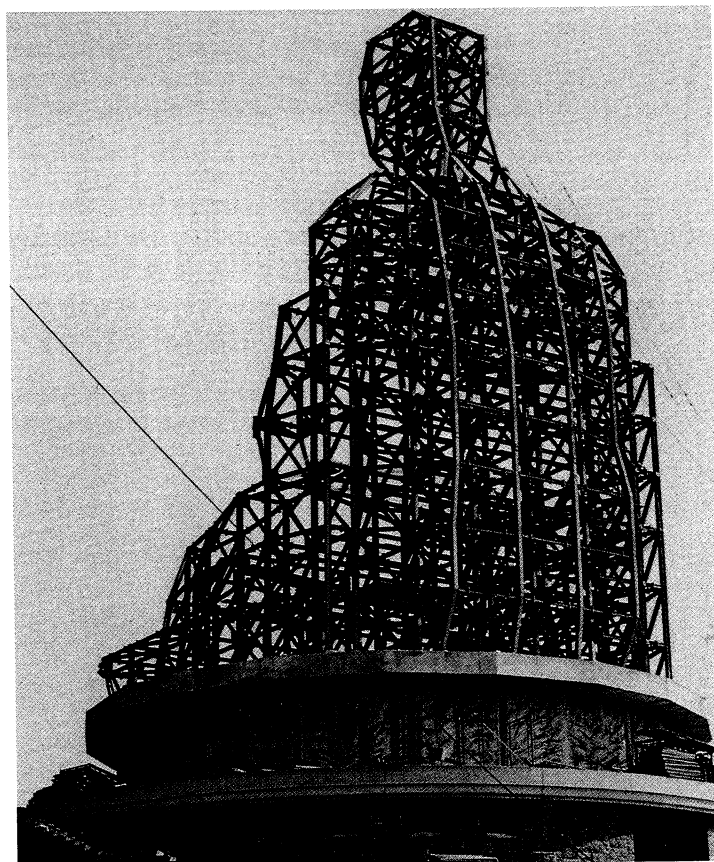
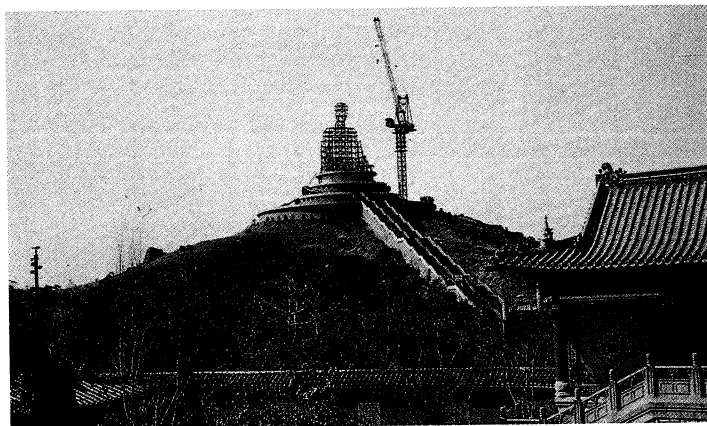
Kennedy Space Center (KSC), NASA's principal space launch base, is located on Florida's Atlantic Coast, and because of constant exposure to salt spray and fog, its steel structure facilities need greater protection from corrosion than is needed at locations farther from the ocean.

NASA decided that there was need for a new type of coating to reduce maintenance cost for gantries, the steel frameworks that provide multi-level access to launch vehicles, and other KSC facilities. Goddard Space Flight Center initiated a research program aimed at development of a superior coating that would not only provide long term resistance to salt corrosion but would also protect KSC launch structures from the very hot rocket exhaust and from the thermal shock created by rapid temperature changes during the first seconds of a launch.

Goddard researchers focused on water-based zinc silicate coatings, which had been available for years; they offered good protection but they required extensive curing. Looking for maximum cost-effectiveness, Goddard sought to improve zinc silicate formulations by boosting the ratio of potassium to silicate while maintaining stability of the formula.

That line of research proved successful and Goddard's effort was hailed as a breakthrough in inorganic chemistry. The high ratio formula eliminated the cure process and provided an answer to KSC's maintenance problem: an easy-to-mix, easy-to-apply, zinc rich coating with a water-based potassium silicate binder that would provide long term protection with a single application. It offers cost advantages in materials, labor hours per application and fewer applications over a given time span.

In 1981, NASA granted a license for the coating process to Shane Associates, Inc., Wynnewood, Pennsylvania. In 1982, Inorganic Coatings, Inc. (IC), Malvern, Pennsylvania signed an agreement to become sole manufacturer and sales agent under the Shane license. IC is now marketing the



At top and in closeup above is Hong Kong's mammoth Po Lin Buddha, shown under construction. The interior structure was coated with a spinoff IC 531 product that provides superior protection against corrosion and offers cost and environmental bonuses.

Among spinoff products that enhance public safety is a NASA-developed coating with superior corrosion resistance for structural security

product under the trade name IC 531 and has developed a number of new coating concepts.

In eight years of commercial use, IC 531 has demonstrated exceptional performance in single-coat applications and as a primer in multi-coat systems where it is combined with epoxy, acrylic and other topcoat formulations. Because IC 531 is water-based, it provides an environmental bonus: it is non-toxic, non-flammable and it generates no volatile organic compounds nor hazardous chemical waste. The high ratio formulation bonds to steel and in about 30 minutes dries to a very hard finish with superior adhesion characteristics. When topcoating is specified, IC 531's no-cure chemistry allows topcoating in two hours or less; that's a big plus, because it allows application of two, even three coats in a single shift.

IC 531 came to public attention in 1984 when, after a seven-month study of various coatings,

it was selected by the National Park Service and the Statue of Liberty Foundation as the best formulation for protecting Miss Liberty in her second century of service to America. It was also chosen as the protective system for Panama Canal rehabilitation.

More recently, the coating was applied to the interior structure of a huge Buddha, roughly the size of Miss Liberty, at Po Lin Temple on Hong Kong's Lantau Island. The coating is used on a great variety of outdoor structures, vehicles and vessels, such as bridges, military tanks, ship-board equipment, dock equipment, buoys, municipal water facilities, power stations, antennas and tractor trailer frames.

How long is IC 531's effective lifetime? No one can say for sure because it hasn't been around long enough to be tested to its limit. At least 14 years, because some of the original Goddard test applications of 1976 are still going strong after lengthy exposure to the Sun, salt and moisture. Probably a lot longer than that. Says IC in company literature: "IC 531 offers virtually permanent protection for steel. We predict it will protect structures for well beyond 25 years. If necessary, it is infinitely maintainable; if damaged, it can easily be touched up with more IC 531."



A tractor trailer frame is coated with IC 531 zinc silicate; the coating's fast cure to ceramic-like hardness allows movement of the frame directly from the coating shop to the assembly line.